

Date: Mon, 29 Nov 93 04:30:43 PST  
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>  
Errors-To: Ham-Homebrew-Errors@UCSD.Edu  
Reply-To: Ham-Homebrew@UCSD.Edu  
Precedence: Bulk  
Subject: Ham-Homebrew Digest V93 #117  
To: Ham-Homebrew

Ham-Homebrew Digest                      Mon, 29 Nov 93                      Volume 93 : Issue 117

Today's Topics:

                    2M 10w amp?  
                    AM+FM=SSB? (4 msgs)  
                    Amplifier for 1270MHz  
                    Kenwood TS-440-S For Sale  
                    LB1473 chips?  
            Phasing SSB - new part that might help.  
                    sw-radio coils...question.  
                    Upgrade to a Micor  
                    WANTED: Davco DR-30 receiver  
                    WANTED: Webster Band-Spanner

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>  
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

-----

Date: 27 Nov 93 17:42:56 EST  
From: swrinde!cs.utexas.edu!howland.reston.ans.net!pipex!sunic!psinntp!psinntp!  
arrrl.org@network.ucsd.edu  
Subject: 2M 10w amp?  
To: ham-homebrew@ucsd.edu

In rec.radio.amateur.homebrew, galen@picea.CFNR.ColoState.EDU (Galen Watts)  
writes:

>In article <2647@arrrl.org> zlau@arrrl.org (Zack Lau) writes:

>>

>>I'm thinking of writing up a stable 2 to 10 watt MRF 137

>>design, though it needs a 23 volt power supply. Running

>>it off a voltage doubler add spurs 75 dB down, so that

>>part still needs work.

>>Zack Lau KH6CP/1

>>Internet: zlau@arrl.org

>

>I've read that if you run a 24 volt device on 12 volts, you get more protection against high SWR. Do the transistors 'not like' this?

I'm not sure if you really get more protection--some devices are already rated for a 30:1 SWR with no degradation in output power.

The linearity does seem to degrade with the FETs, I've seen the 3rd order IMD come up quite a bit. On FM or CW, this isn't a problem.

The main problem is the drop in gain--can you really afford to lose 6 dB or so in gain? This can be a real problem at 440, where you might have only 7 or 8 dB of gain to start with.

On the other hand, 24 or 28 volts can make a lot of sense if you are tower mounting amplifiers, since the DC voltage drop isn't as much of a problem.

>

>What are the differences between bipolar and FET devices when you lower the voltage?

The cleanest amps I've built tend to be those using FETs with lots of bias current. This is particularly true with regard to high order distortion products. I'd expect the distortion to increase with bipolars as you dropped the voltages, though I don't recall any tests I've done.

Zack Lau KH6CP/1

Internet: zlau@arrl.org "Working" on 24 GHz SSB/CW gear

Operating Interests: 10 GHz CW/SSB/FM

US Mail: c/o ARRL Lab 80/40/20 CW

225 Main Street Station capability: QRP, 1.8 MHz to 10 GHz

Newington CT 06111 modes: CW/SSB/FM/packet

amtor/baudot

Phone (if you really have to): 203-666-1541

-----  
Date: 28 Nov 1993 02:11:30 +0200

From: pipex!sunic!news.funet.fi!butler.cc.tut.fi!lehtori.cc.tut.fi!not-for-mail@uunet.uu.net

Subject: AM+FM=SSB?

To: ham-homebrew@ucsd.edu

Mike Butts (mbutts@netcom.com) wrote:

- > In the ARRL's "Solid State Design for the Radio
- > Amateur", by Hayward and DeMaw, on p. 184 of
- > the 1986 edition, after a nice summary of
- > filter and phasing principles, plus a mention
- > of Weaver, they say:
  
- > "Also, it may be shown mathematically that
- > a carrier which is amplitude modulated
- > properly and frequency modulated
- > simultaneously will yield a single-
- > sideband output."
  
- > I haven't succeeded in figuring this out.
- > Can someone show this mathematically or otherwise?
- > Has it ever been done in a real system?

The only practical implementation I know of was used in OSCAR 7 B-mode linear transponder. (A linear transponder passband is just a SSB signal a few hundred kHz wide).

The amplitude information is separated at the transmitter input and the phase information is hard limited and amplified in class-C stages. The amplitude information controls a PWM power supply feeding the output transistor (running in class-C) and thus also AM-modulating the signal. The resulting signal is SSB. The total efficiency (unregulated DC to RF) is very high, which is extremely important in satellites.

This system was developed by Karl Meinzer DJ4ZC.  
I checked The Satellite Experimenters Handbook and in the list of references there are a few related articles.

K. Meinzer,  
Lineare Nahrichtensatellitentransponder Durch Nichtlinear Signalzerlegung  
(Linear Communications Satellite Transponder Using Non-linear Signal  
Splitting), Doctoral Dissertation, Marburg University, Germany, 1974.

K. Meinzer,  
A Frequency Multiplication Technique for VHF and UHF SSB.  
QST , Oct 1970, pp 32-35.

A more developed system will be used in some transmitters in the Phase-3D satellite, which will be launched in 1995/1996. The block diagram for the 10 GHz transmitter looks really complicated with separate feedback control loops for phase and amplitude. A class-C UHF/SHF output stage modulated

by varying the supply voltage, is not a particularly good AM modulator and thus the feedback loop in the amplitude channel is required to predistort the applied voltage.

Paul OH3LWR

-----  
Phone : +358-31-213 3657  
X.400 : G=Paul S=Keinanen O=Elisa-Tampere A=ELISA C=FI  
Internet: Paul.Keinanen@Telebox.tele.fi  
Telex : 58-100 1825 (ATTN: Keinanen Paul)  
Mail : Hameenpuisto 42 A 26  
FIN-33200 TAMPERE  
FINLAND

-----  
Date: 28 Nov 93 17:30:01 GMT  
From: rit!atd@cs.rochester.edu  
Subject: AM+FM=SSB?  
To: ham-homebrew@ucsd.edu

AM + FM = SSB with carrier works in the limit if the modulation index is low enough that only the first sideband of the FM is significant. Remember that FM has an infinite number of sidebands.

-----  
Date: 27 Nov 1993 18:13:49 GMT  
From: swrinde!sdd.hp.com!col.hp.com!bobw@network.ucsd.edu  
Subject: AM+FM=SSB?  
To: ham-homebrew@ucsd.edu

I wrote:

< AM + FM = SSB discussion >  
: Short hand-waving explanation follows...  
  
: Amplitude modulation has sidebands symmetrical about the carrier  
: (i.e. upper sideband is mirror image of lower sideband)  
: NARROWBAND FM has the same sidebands as AM but with one sideband  
: out of phase with the other.  
: Combining (subtracting?) an AM and narrowband FM with the same  
: modulating signal can cancel out one of the sidebands. I think  
: subtracting may be in order here to get rid of the carrier and  
: leave only the desired single-sideband.  
: The matching requirements throughout the system are significant.

: That is, any mismatch between the modulating schemes will result  
: in a partial appearance of the unwanted sideband.

I just remembered, I once worked out the math to this, but for  
the case where the carrier does not get cancelled out.

See Chapter 6.10 of "Spectrum and Network Measurements" by R.A Witte,  
Prentice Hall, 1991.

Bob Witte / HP PMO (Colo Springs) / bobw@col.hp.com / KB0CY / (719) 590-3230

-----  
Date: 27 Nov 1993 18:06:27 GMT  
From: swrinde!elroy.jpl.nasa.gov!sdd.hp.com!col.hp.com!bobw@network.ucsd.edu  
Subject: AM+FM=SSB?  
To: ham-homebrew@ucsd.edu

Mike Butts (mbutts@netcom.com) wrote:

: In the ARRL's "Solid State Design for the Radio  
: Amateur", by Hayward and DeMaw, on p. 184 of  
: the 1986 edition, after a nice summary of  
: filter and phasing principles, plus a mention  
: of Weaver, they say:

: "Also, it may be shown mathematically that  
: a carrier which is amplitude modulated  
: properly and frequency modulated  
: simultaneously will yield a single-  
: sideband output."

: I haven't succeeded in figuring this out.  
: Can someone show this mathematically or otherwise?  
: Has it ever been done in a real system?

Short hand-waving explanation follows...

Amplitude modulation has sidebands symmetrical about the carrier  
(i.e. upper sideband is mirror image of lower sideband)

NARROWBAND FM has the same sidebands as AM but with one sideband  
out of phase with the other.

Combining (subtracting?) an AM and narrowband FM with the same  
modulating signal can cancel out one of the sidebands. I think  
subtracting may be in order here to get rid of the carrier and  
leave only the desired single-sideband.

The matching requirements throughout the system are significant.  
That is, any mismatch between the modulating schemes will result  
in a partial appearance of the unwanted sideband.

Bob Witte / HP PMO (Colo Springs) / bobw@col.hp.com / KB0CY / (719) 590-3230

-----  
Date: 26 Nov 93 21:14:26 EST  
From: psinntp!arrl.org@uunet.uu.net  
Subject: Amplifier for 1270MHz  
To: ham-homebrew@ucsd.edu

In rec.radio.amateur.homebrew, mack@fcs260c.ncifcrf.gov (Joe Mack) writes:

>  
>Zack how do you get 240W of 12 V up a tower?  
> Jo NA3T  
> (sorry thats Joe)  
> Joseph MACK NA3T mack@ncifcrf.gov

First of all, I wouldn't try run a whole bunch of power amplifiers of a single supply. After all, one of the benefits of using hybrids is redundancy.

Also, rather than using Wilkenson combiners, I'd probably use ring hybrids, similar to those used by Chip Angle in the April 1991 QST. It seems a lot easier to get 50 ohm terminations than 100 ohm terminations for the Wilkensons.

I'd mount the power transformer at the base of the tower and run either unregulated DC or low voltage AC up the tower. The AC case has less loss so I'll look at the DC case.

12 Gauge wire has a resistance of 1.6 ohms/1000 ft., so I guess you would lose 3.2 volts if it drew 10 amps through 100 ft. of cable. Since most supplies are designed to put out 13.8, rather than 12.0 volts, it isn't quite as bad as it sounds. Low dropout PNP type regulators could be used to make up the difference. I'd probably recommend 2 DC cables up the tower feeding 3 regulators each. Thus, if a cable failed, the amplifier would still be functional, though at reduced power.

Zack Lau KH6CP/1

Internet: zlau@arrl.org

"Working" on 24 GHz SSB/CW gear

Operating Interests: 10 GHz CW/SSB/FM  
US Mail: c/o ARRL Lab 80/40/20 CW  
225 Main Street Station capability: QRP, 1.8 MHz to 10 GHz  
Newington CT 06111 modes: CW/SSB/FM/packet  
amtor/baudot  
Phone (if you really have to): 203-666-1541

-----  
Date: Fri, 26 Nov 1993 14:28:49 GMT  
From: netcomsv!netcom.com!toddwulf@decwrl.dec.com  
Subject: Kenwood TS-440-S For Sale  
To: ham-homebrew@ucsd.edu

Kenwood TS-440-S for sale with 200 watt power supply. Any offers?

--

toddwulf@netcom.com

-----  
Date: Fri, 26 Nov 1993 03:57:05 GMT  
From: netcomsv!netcom.com!fmitch@decwrl.dec.com  
Subject: LB1473 chips?  
To: ham-homebrew@ucsd.edu

Gary Tennyson (gary@vulcan.com) wrote:

: I've also been thinking of building a solid-state tuning indicator. I am  
: presently using a scope, but it is old (and the only tube device left in  
: the shack). My question is, what is the size of the LED matrix, and  
: where does one obtain a matrix.

: I assume that, with a matrix, a scope-type indicator can be emulated with  
: a pair of A to D converters. Connecting the output of the converters to  
: the matrix could be another problem, though, since one would need to  
: address both x & y coordinates.

: I've looked into using an LCD screen, but those seem to be addressed  
: sequentially. For tuning indicators, I'm not sure that they are  
: appropriate.

: --

: Gary Tennyson BellSouth Telecommunications, Inc.

: Internet: gary@vulcan.com

hi gary... thanks for responding...

the cri-200 uses two of the lb1473 chips, one for x and one for y...  
the matrix is 8x13 using parts of 4 5x7 led matrix chips... the  
lb1473 chips are ac coupled out of the equivalent of the scope outputs  
of the cri-200... and it works just like a scope! really a nice tuning  
indicator... my friend, marv, k4bvg and i are looking at designing a  
stand alone tuning indicator using a led matrix and we thought the  
cri-200 circuit warrants some experimentation... the stand alone unit  
will use the x and y output from the modem to avoid having to have  
filters in the tuning unit... marv says he thinks the 3914 led driver  
chip from rad shack will work but we haven't got a data sheet yet to  
see... and the led matrix units are cheap... 3-5 bux from digi key for  
5x7 matrix... or u can buy leds in sticks to stack any way you want  
the matrix to appear... keep the net posted on any experiments you  
conduct...

mitch, wa4osr  
fmitch@netcom.com

--

-----  
fmitch@netcom.com  
Felton "Mitch" Mitchell, WA4OSR in Mobile, Alabama USA  
205-342-7259 home, 205-476-4100 work, 205-476-0465 FAX  
co-sysop for W4IAX bbs running fbb ... sysop for WA4OSR DXCluster in Mobile..  
-----

-----  
Date: Fri, 26 Nov 1993 01:04:24 GMT  
From: ucsnews!sol.ctr.columbia.edu!news.kei.com!eff!usenet.ins.cwru.edu!nshore!  
seastar!jjw@network.ucsd.edu  
Subject: Phasing SSB - new part that might help.  
To: ham-homebrew@ucsd.edu

Regarding the recent discussions about SSB generation & detection using  
phasing, has anybody seen the ad on pg 37 of November's Microwaves &  
RF? It looks like Mini-Circuits has a new device - a 90 degree  
splitter with <1 degree of phase unbalance and <.2db of amplitude  
imbalance from 3.2 to 32MHz. Cost is 89.95 qty 1-9.

Looks interesting... Anybody out there try this yet?

-->jjw n9jzw jjw@seastar.org

--

John Welch, N9JZW

-----  
Date: Sun, 28 Nov 1993 22:49:22 GMT



From: swrinde!cs.utexas.edu!math.ohio-state.edu!caen!msuinfo!netnews.upenn.edu!  
netnews.noc.drexel.edu!dunx1.ocs.drexel.edu!dunx1!st92ba44@network.ucsd.edu  
Subject: sw-radio coils...question.  
To: ham-homebrew@ucsd.edu

Hello there.

I'm not sure if this is the right place to ask but the title seemed appropriate (and I couldn't find a faq). Anyhows, I'm working on a crystal shortwave radio which requires a t-50-2 toroid core onto which the coil is wound. I'm wondering if a straight (bar) ferrite core wouldn't achieve the same end. (Plus, I can't find the toroid around here--I'm rather close to finishing it so ordering it would most likely kill me :)

If the bar does work, could anyone give me a tip on how many turns (of wire) it would need.

BTW, how well do the homemade radios work? Especially the crystal-diode kind.  
Thanks.

-----  
antonio gatta  
st92ba44@dunx1.ocs.drexel.edu  
-----

Date: Wed, 24 Nov 93 20:57:50 CST  
From: tribune.usask.ca!canopus.cc.umanitoba.ca!bison!draco!kynes1!sys6626!inqmind!  
bills@decwrl.dec.com  
Subject: Upgrade to a Micor  
To: ham-homebrew@ucsd.edu

Never volunteer to be on the technical comittee of a repeater club unless you have some idea of what's involved:

Anyway....I'm a member of a repeater group that is currently involved in interconnecting repeater sites in several spots in southern Manitoba. At our last executive meeting, I was told we've had a complaint that our "flagship" repeater has a front end so broad that it lets in calls 20 khz off-channel - this is well past the adjacent channel and getting into the deep woods. The VHF receiver is a Micor mobile, with the usual adaption to repeater service. Is it possible to get some third-party upgrade filter to tighten the response a bit, and upgrade this - or should we start saving up for a commercially built repeater ?

( And is this problem related to the fact that the repeater is on a CBC broadcast tower with 100,000 watts of various broadcast transmitters on it ? )

Bill

bills@inqmind.bison.mb.ca-  
The Inquiring Mind BBS, Winnipeg, Manitoba 204 668-8845

-----  
Date: Fri, 26 Nov 1993 06:58:57 GMT  
From: netcomsv!netcom.com!fmitch@decwrl.dec.com  
Subject: WANTED: Davco DR-30 receiver  
To: ham-homebrew@ucsd.edu

hi, mitch, wa4osr here in mobile, alabama...

i am looking for a Davco DR-30 receiver, working or not... email me  
here or call numbers below...

thanks,  
mitch, wa4osr  
fmitch@netcom.com  
205-342-7259 home  
205-476-4100 work  
205-476-0465 fax

--

-----  
fmitch@netcom.com  
Felton "Mitch" Mitchell, WA4OSR in Mobile, Alabama USA  
205-342-7259 home, 205-476-4100 work, 205-476-0465 FAX  
co-sysop for W4IAX bbs running fbb ... sysop for WA4OSR DXCluster in Mobile..  
-----

-----  
Date: Sat, 27 Nov 1993 05:22:03 GMT  
From: netcomsv!netcom.com!fmitch@decwrl.dec.com  
Subject: WANTED: Webster Band-Spanner  
To: ham-homebrew@ucsd.edu

hi, mitch wa4osr here in mobile, alabama...

i am looking for a webster band spanner mobile antenna... if you have  
one you would like to get rid of please email me or call me at the  
numbers below...

thanks,  
mitch, wa4osr  
fmitch@netcom.com

--

-----  
fmitch@netcom.com

Felton "Mitch" Mitchell, WA4OSR in Mobile, Alabama USA

205-342-7259 home, 205-476-4100 work, 205-476-0465 FAX

co-sysop for W4IAX bbs running fbb ... sysop for WA4OSR DXCluster in Mobile..  
-----

-----  
End of Ham-Homebrew Digest V93 #117

\*\*\*\*\*

\*\*\*\*\*